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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/265,860	03/11/1999	MASANORI IWASAKI	SON-1500	5002

7590 05/19/2003

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EXAMINER

SPECTOR, DAVID N

ART UNIT PAPER NUMBER

2873

DATE MAILED: 05/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/265,860

Applicant(s)

IWASAKI, MASANORI

Examiner

David N. Spector

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 1999.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4-10 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 March 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 11 March 1999 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: **DETAILED ACTION**.

DETAILED ACTION

Objections - Specification

1. The specification is objected to because of the following informalities. The current specification appears to be a literal translation of a foreign-language document into the English language. It is replete with defects and errors that render its meaning unclear. Appropriate revisions/corrections are required, in proper idiomatic English, and in compliance with 37 CFR 1.52(a) and (b). The revisions/corrections filed must be accompanied by a statement that no new matter is incorporated or being introduced therein. These defects and errors include, *inter alia*:

(a) The characterization of a "refractive index distribution which is substantially proportional [*Emphasis Added*] to the square of the distance from the optical axis" (Page 2, Line 25-Page 3, Line 2) does not clearly include or exclude a refractive index distribution that is inversely proportional to the square of the distance from the optical axis. This is a particularly significant defect, inasmuch as the instant disclosure appears to suggest that the refractive index distribution lens claimed therein functions like a positive lens (*e.g. the "on-axis optical path" is converging in FIG. 1; a positive curvature is added is to one or both end-surfaces in FIG. 5*), in which case the refractive index distribution of the lens would necessarily be inversely proportional to the square of the distance from the optical axis; while nothing therein provides a more-detailed and/or otherwise adequate characterization of the refractive index distribution which the examiner needs to form a clear understanding of the instant invention.

(b) The phrase "particularly, it is preferable that the lens length is as small as possible (for example zero) because the lens length can be shortened." [*Emphasis Added*] (Page 4, Lines 9-11) is incomprehensible.

(c) The phrase "if material which has no adverse effect on the lens and the pickup element is merely selected as the adhesive agent." [*Emphasis Added*] (Page 4, Lines 21-22) is incomprehensible.

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(d) There appears to be an inconsistency in applicant's definition/use of the quantity **A**, as used in the instant specification. For example, as used in the expression $Z = (0.5\pi)/(A)^{1/2}$ (Page 7, Lines 12-13) for the length of the lens, where the coefficient 0.5π is identified as a "meandering period" **P** (Page 7, Lines 11-12); and, in particular with applicant's characterization of the quantity **A** as "[a] refractive index distribution constant, $A^{1/2}$ " (Page 7, Line 7), and the subsequent characterizations where "**A** represents a focusing parameter" (Page 7, Lines 20-21), and **P** therein. *(While applicant is free to act as his or her own lexicographer under certain conditions, it would be very desirable from the perspective of the examiner if the claimed invention were characterized by: a refractive index distribution $N(r)$ following the general form of $N(r) = N_0 + N_1r^2 + N_2r^4 + N_3r^6 + \dots$; where $N(r)$ is the refractive index at a standard wavelength and at a distance r from a central axis in a cross section perpendicular to the central axis, N_0 is the value of the refractive axis at a standard wavelength on the central axis, and N_1, N_2, N_3, \dots are coefficients expressing the refractive index distribution at a standard wavelength; and the pitch of refractive index distribution lens, generally expressed as $P = 2\pi/(N_0/(-N_1))^{1/2}$.)*

(e) The actual discussion of the material presented in **FIG. 2** and **FIG. 3** contained in the specification (Page 8, Lines 13-15) amounts to essentially nothing more than what is stated in the "Brief Description of the Drawings" presented therein (Page 5, Line 23-Page 6, Line 5). Further, there is no other discussion of these figures *(and/or the relevance of what is shown in said figures to the instant invention)* presented elsewhere in the specification.

Objections – Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, at least the overall shape of the claimed "refractive index distribution" should be illustrated in relation to the "cross-sectional area vertical to the optical axis" recited in claims 1 and 7; and similarly the "meandering period **P**" recited in claim 6 must be shown *(at least in terms of the*

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usual concept of the pitch of a refractive index distribution lens), or the feature(s) canceled from the claim(s).

3. In addition, it would appear that **FIG. 2** and **FIG. 3** could be deleted in their entirety (*as noted above, in paragraph 1(e)*). In any case, No new matter should be entered. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. THE OBJECTION TO THE DRAWINGS WILL NOT BE HELD IN ABEYANCE.

Objections – Claims

4. Independent claims 1 and 6 (along with all of their dependent claims 2-5 and 9-10; and claims 7-8, respectively) are objected to for a lack clarity engendered by certain grammatical/linguistic defects therein. Appropriate clarification/correction is required in regard to each of the following informalities. (*Since the examiner understands the general intent of these claims the lack of clarity engendered by the informalities therein is being raised here under an objection to the affected claims rather than by rejections thereto under 35 U.S.C. § 112.*)

(a) Independent claim 1 recites the phrase: "refractive index distribution which is substantially proportional [*Emphasis Added*] to the square of the distance from the optical axis" (Claim 1, Lines 2-4). Here, it is unclear if the term "substantially proportional" includes/excludes a refractive index distribution which is inversely proportional to the square of the distance from the optical axis.

(b) Independent claim 6 recites the phrases "meandering period" (Claim 6, Line 6) and "refractive index distribution constant" (Claim 6, Line 7) without sufficient definition in the specification and the claims.

(c) In addition, claim 7 is objected to for expressly including the phrase "refractive index distribution which is substantially proportional [*Emphasis Added*] to the square of the distance from the optical axis" (Claim 7, Lines 2 and 3). Here too, it is unclear if the

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term substantially proportional includes/excludes a refractive index distribution which is inversely proportional to the square of the distance from the optical axis.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

6. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Claims 1, 2, 4, 5, 9, and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsuchida (US-6130787-A).

FOR EXAMINATION PURPOSES ONLY – In light of the examiner's objections to independent claim 1 (in paragraph 4(a), above) the intended meaning of the term "substantially proportional" (Claim 1, Line 7) is broadly interpreted in a manner which encompasses both of the conditions of -- directly proportional- - and/or -- inversely proportional- -.

(a) In regard to independent claim 1 Tsuchida discloses an image pickup device (**FIG. 23**) characterized in that a refractive index distribution lens **31** having a refractive index distribution $n(r)$ (col. 3, ln. 49-62) which is substantially proportional to the square of the distance r from the optical axis of the lens in a cross-section vertical (*e.g. perpendicular*) to the optical axis, is provided as an imaging lens in the neighborhood of a imaging face of an image pick-up element **32** (col. 17, ln. 23-36), as clearly shown in **FIG. 23**. Independent claim 1 is therefore anticipated by Tsuchida.

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(b) In regard to claim 2, Tsuchida discloses an image pickup device according to independent claim 1 from which claim 2 depends. Tsuchida further discloses an image pickup device according to independent claim 1 wherein said refractive index distribution lens **31** is adhesively attached to said imaging face of said image pick-up device **32** by [an] adhesive agent (col. 17, ln. 31-36). Claim 2 is therefore anticipated by Tsuchida.

(c) In regard to claim 4, Tsuchida discloses an image pickup device according to independent claim 1 from which claim 4 depends. Tsuchida further discloses an image pickup device according to independent claim 1 wherein infrared-ray absorption means for absorbing infrared rays is provided on a light-incident face of said refractive index distribution lens **31** (col. 18, ln. 22-27). Claim 4 is therefore anticipated by Tsuchida.

(c) In regard to claim 5, Tsuchida discloses an image pickup device according to independent claim 1 from which claim 5 depends. Tsuchida further discloses an image pickup device according to independent claim 1 wherein curvature is provided on one or both end surfaces of said refractive index distribution lens **31** (col. 17, ln. 26; col. 16, ln. 6-12). Claim 5 is therefore anticipated by Tsuchida.

(d) In regard to claim 9, Tsuchida discloses an image pickup device according to independent claim 1 from which claim 9 depends. Tsuchida further discloses an image pickup device according to independent claim 1 wherein said lens **31** has a cylindrical shape having a light incident face at one end along said optical axis, and said imaging face at said opposite end (e.g. as clearly illustrated in **FIG. 23**). Claim 9 is therefore anticipated by Tsuchida.

(e) In regard to claim 10, Tsuchida discloses an image pickup device according to claim 1/9 from which claim 10 depends (*e.g. from independent claim 1 by way of the intervening claim 9*). Tsuchida further discloses an image pickup device according to independent claim 1/9 wherein curvature is provided on one or both end surfaces of said refractive index distribution lens **31** (col. 17, ln. 26; col. 16, ln. 6-12). Claim 10 is therefore anticipated by Tsuchida.

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FOR EXAMINATION PURPOSES ONLY – In light of the examiner's objections to independent claim 6 (in paragraph 4(b), above) the intended meaning of the phrase: "length of said refractive index distribution lens is set to a value obtained by dividing a meandering period $P = 0.5\pi + n\pi$, by a refractive index constant of said refractive index distribution lens for a use wavelength of said image pickup device" is interpreted as being equivalent to - length of said refractive index distribution lens is set to a value equal to one-quarter of its pitch (e.g. $p/4$; where $p = 2\pi/(N_0 - N_1)^{1/2}$) - -. Additionally, and in light of the examiner's objections to independent claim 7 (in paragraph 4(c), above) the term "substantially proportional" (Claim 7, Line 3) is broadly interpreted in a manner which encompasses both of the conditions of - - directly proportional- - and/or - - inversely proportional- -.

8. Claims 6-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsuchida (US-6130787-A).

(a) In regard to independent claim 6 Tsuchida discloses an image pickup device (FIG. 23) characterized in that a single refractive index distribution lens 31 is provided as an imaging lens in the neighborhood of an imaging face of an image pickup element 32 (col. 17, ln. 23-36), as clearly shown in FIG. 23, wherein the lens length (Z) of said refractive index distribution lens is set to a value obtained by dividing the "meandering period $P = 0.5\pi + n\pi$ " by a refractive index constant of said refractive index distribution lens for a use wavelength of said image pickup device (e.g. $Z = p/4 = 2\pi/(N_0 - N_1)^{1/2}$). Independent claim 6 is therefore anticipated by Tsuchida.

(b) In regard to claim 7, Tsuchida discloses an image pickup device according to independent claim 6 from which claim 7 depends. Tsuchida further discloses an image pickup device according to independent claim 6 wherein the refractive index distribution of said refractive index distribution lens is "substantially proportional" to the square of the distance from the optical axis of the lens in a cross-section vertical (e.g. perpendicular) to the optical axis (col. 3, ln. 49-62). Claim 7 is therefore anticipated by Tsuchida.

(c) In regard to claim 8, Tsuchida discloses an image pickup device according to independent claim 6 from which claim 8 depends. Tsuchida further discloses an image pickup device according to independent claim 6 wherein said refractive index distribution lens 31 is adhesively attached to said imaging face of said image pick-up device 32 by [an] adhesive agent (col. 17, ln. 31-36). Claim 8 is therefore anticipated by Tsuchida.

Allowable Subject Matter

9. Claim 3 is objected to as being dependent upon a rejected base claim, but could be allowable if rewritten in independent form including all of the limitations of the

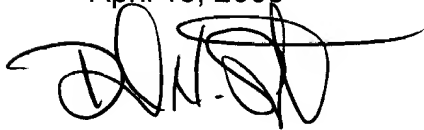
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amended base claim (*e.g. independent claim 1 must be amended to overcome the objections thereto discussed in paragraph 4(a) of this Office action*) and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: the image pick-up device commensurate with the appropriately amended claim 3 (*e.g. with its base claim amended as noted above*) would be distinguished over the prior art made of record by a thin-film infrared filter formed disposed on the light incident face of the device for reflecting infrared rays.

Other Remarks/Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Spector whose telephone number is (703) 305-1521. The examiner can normally be reached at this number Monday through Friday between 6:00 AM and 2:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps, can be reached on (703) 308-4883. The fax number for the organization where this application is assigned is (703) 308-7722.

April 13, 2003



David N. Spector
Primary Examiner